REMARKS

Claims 1-26 are pending in this application.

Applicants have amended claims 2-4, 7, 8, 13, 19, 22, and 25. The changes made herein to the claims do not introduce any new matter.

In response to the objection to the Abstract of the Disclosure ("the Abstract"), Applicants have provided a new Abstract. Accordingly, Applicants respectfully request that the objection to the Abstract be withdrawn.

In response to the objection to the claims, Applicants have amended claims 13 and 25 to correct the informalities cited by the Examiner. Accordingly, Applicants respectfully request that the objection to the claims be withdrawn.

Applicants respectfully request reconsideration of the rejection of claims 8 and 22 under 35 U.S.C. § 101 as lacking utility because the claimed subject matter is inoperative. Applicants have amended claims 8 and 22 to specify that N is greater than or equal to 2. Thus, the claimed subject matter no longer includes the case in which N is equal to 1 and the specified equation is invalid. Accordingly, Applicants submit that claims 8 and 22 now define subject matter that satisfies the utility requirement of 35 U.S.C. § 101, and request that the rejection of these claims thereunder be withdrawn.

Applicants respectfully request reconsideration of the rejection of claims 1-26 under 35 U.S.C. § 102(b) as being anticipated by *Bessho et al.* (U.S. Patent No. US 6,178,112 B1). As will be explained in more detail below, the *Bessho et al.* reference discloses a different type of solid magnetic memory that does not include each and every feature of the claimed subject matter.

The *Bessho et al.* reference discloses an exchange coupling type of solid magnetic memory. In contrast, the subject application describes a field driven magnetoresistive random access memory (MRAM) and a thermally assisted MRAM. For the reasons set forth below,

the solid magnetic memory shown by *Bessho et al.* is a completely different type of memory than the field driven and thermally assisted MRAMs described in the subject application.

The *Bessho et al.* reference discloses an element that controls magnetization without applying a magnetic field from outside (see the Abstract at lines 1-2). The magnetic coupling state between magnetic layers is changed to control the direction of magnetization between the magnetic layers (see the Abstract at lines 12-15). In particular, the *Bessho et al.* reference states that "[t]he direction of magnetization of the storage medium, as an element for storage, is controlled without reliance upon the application of [a] magnetic field from outside." Column 48, lines 24-27. In contrast, in the claimed subject matter, the direction of magnetization of the storage medium is controlled by the external field in combination with a heating process.

In the *Bessho et al.* reference, a semiconductor layer (column 58, lines 39-48), a dielectric layer (column 59, lines 17-19), an electrically conductive layer (column 59, lines 46-51), and a composite material (column 60, lines 3-9) are used to control the exchange coupling (see column 58, line 16 and the following related sections). When a current is applied, the magnitude of the exchange interaction can be changed. If the element is not specially designed (see Figures 8-11), then the information recording element 30 is a write-once type (see column 20, lines 32-36). In contrast, in the claimed subject matter, the magnetization is controlled by both the external field and the temperature, with the result that the element is a recordable type instead of a write-once type.

In the *Bessho et al.* reference, the information recording element 140 has to continue the current supply to the electrically conductive layer of the driving layer 141 to retain the re-set state and hence is not a nonvolatile memory (see column 41, lines 25-29). Without special design, the exchange coupled memory is *not* a nonvolatile memory. In contrast, in the claimed subject matter, the element is a nonvolatile memory.

To serve as a nonvolatile memory, the *Bessho et al.* memory requires the use of a special design (see the two control lines 211 and 212 in Figure 39 and column 57, lines 2-3). This complicated structure results in low density and high cost. In contrast, in the claimed subject matter, only one line is required.

The *Bessho et al.* reference also describes a multi-value structure. Specifically, if the movable magnetic layers 142, 152, and 162 having three or more minimum anisotropic energy points with respect to the direction of magnetization are used, it is possible to make a three-valued or higher multi-valued recording with a sole movable magnetic layer (see column 46, lines 52-56). This requires multi-minimum anisotropic energy-points to maintain the multi-value information. In contrast, in the claimed subject matter, there are only two minimum anisotropic energy points. The claimed subject matter uses the anti-ferromagnetic layer to pin the recording layer. After cool down to room temperature, the magnetization can be maintained at any direction instead of just the minimum anisotropic energy point.

Lastly, in the *Bessho et al.* reference, the recording layer is a soft ferromagnetic layer (see column 62, lines 12-15). The external field can change the magnetization of the storage carrier. In contrast, in the claimed subject matter, the storage layer is pinned by an anti-ferromagnetic layer such that the magnetization of the storage layer cannot be changed without a heating process.

In suumary, Applicants submit that the *Bessho et al.* reference discloses a magnetic memory that is completely different from that defined in the claimed subject matter. The *Bessho et al.* reference realizes switching by controlling the exchange coupling through either current, heat, light, or other methods. By controlling the exchange coupling between the recording layer and a stationary layer, the magnetization of the recording layer can be switched. In contrast, in the claimed subject matter, the magnetization of the recording layer is changed by a combination of the external field and the heating process. Neither a

stationary layer nor a magnetic coupling layer shown by *Bessho et al.* is required in the claimed subject matter.

Thus, for at least the foregoing reasons, the *Bessho et al.* reference does not disclose each and every feature of the claimed subject matter defined in claims 1-26, as presented herein. Accordingly, claims 1-26, as presented herein, are patentable under 35 U.S.C. § 102(b) over *Bessho et al.*

In view of the foregoing, Applicants respectfully request reconsideration and reexamination of claims 1-26, as presented herein, and submit that these claims are in condition for allowance. Accordingly, a notice of allowance is respectfully requested. In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at **(408) 749-6902**. If any additional fees are due in connection with the filing of this paper, then the Commissioner is authorized to charge such fees to Deposit Account No. 50-0805 (Order No. AGSGP011).

Respectfully submitted,
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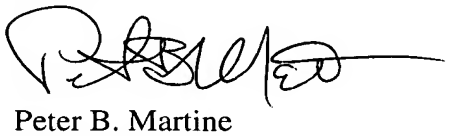

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